NOAA NORTHWEST FISHERIES SCIENCE CENTER

Background and Response to Review Panel Reports on
External Review of Data and Information Used in Fishery Stock Assessments
September 17 – 20, 2013
Seattle, Washington

This report is the formal response of the Northwest Fisheries Science Center (NWFSC) to independent peer review panel comments assessing the data and data management that are required for conducting stock assessments of federally managed groundfish species on the US West Coast. The reports of individual panel members and materials supporting the review can be found at the following location:

http://www.nwfsc.noaa.gov/news/events/program_reviews/2013/index.cfm

BACKGROUND AND CHARGE TO REVIEW PANEL

On the West Coast of the U.S., the Pacific Fishery Management Council (PFMC) implements four fishery management plans (FMPs) as well as a developing Ecosystem FMP that are supported by information provided by NOAA Fisheries and the states. The two NMFS Science Centers have designated lead and supporting roles for different FMPs. The NWFSC has the scientific lead for groundfish, and the Southwest Fisheries Science Center (SWFSC) for coastal pelagic species. The Centers have shared responsibility for Pacific salmon under both Magnuson-Stevens Fishery Conservation and Management Act (MSA) and Endangered Species Act (ESA) due to the complexity of the issues and their life history (spawning in rivers and streams and maturing in the ocean). As the lead for stock assessments for the groundfish FMP, the NWFSC provides formal scientific input for their management in collaboration with partners and the West Coast Regional Office (WCRO); the SWFSC develops some assessments and conducts some data collection in the California region. We also collaborate with Canadian partners and work with the WCRO to provide data and advice in support of the U.S. – Canada Whiting Treaty, under which whiting are managed.

In January 2013 NOAA Fisheries initiated a standardized five-year cycle to review science conducted by each of the six Science Centers and the headquarters Office of Science and Technology. Annually, there will be a national theme to the reviews, and the focus of the first peer review was on data and information collected and compiled for fishery stock assessments mandated under the MSA; our review focused on West Coast groundfish species[1]. Review panel members were accomplished scientists from both inside and outside the federal government and were charged to review whether the Center is collecting the right types and amounts of information for fishery stock assessments, and to identify opportunities to improve the collection and compilation of this information. Specifically, the review focused on the data used in assessing 90+ species of groundfish that range from flatfish and rockfish to sablefish and Pacific whiting (hake). Key fishery independent data comes from a bottom trawl survey,

[1] It is worth noting that the data used in harvest management of salmon data will be reviewed in 2015 during the review of protected species science.

which is supplemented by an acoustic-trawl survey for hake, a hook and line survey for rockfish, a juvenile rockfish survey, and an occasional cowcod visual survey. Commercial and recreational fishery-dependent data and observer data were also reviewed. We also presented information on oceanographic, habitat and additional biological data collections as appropriate. This peer review provided us the opportunity to present the accomplishments and challenges we face in collecting, managing and using fishery independent and dependent information, and to receive constructive comments on survey design and priority, data collection and management and prospects for use of emerging technologies to maintain or improve the utility and value of the data as well as the transparency of the information to all partners.

We asked the Panel to provide their insights on the following questions:

- ✓ Relationship of current and planned fishery assessment data activities to Center fishery assessments mandates and requirements – is the Center doing the right things?
- ✓ Opportunities – are there opportunities that the Center should be pursuing in collecting and compiling fishery assessment data, including shared approaches with partners?
- ✓ Scientific/technical approach – are the Center's fishery data objectives adequate, and is the Center using the best suite of techniques and approaches to meet those objectives?
- ✓ Organization and priorities – is the Center's fishery data system properly organized to meet its mandates and is the allocation of resources among program appropriate?
- ✓ Scientific conduct – are the Center's fishery data programs being conducted properly (survey design, standardization, integrity, peer review, transparency, confidentiality, etc.)?

REVIEW PANEL

The review panel members were respected members of the scientific community.

Robert J. Rosenbauer, Chair, US Geological Survey, Menlo Park, California
Andrew Cooper, Simon Fraser University, Vancouver, Canada
Don Gunderson, University of Washington, Seattle, WA
James Ianelli, NOAA Alaska Fisheries Science Center, Seattle, WA
Steven Katz, NOAA Channel Islands Marine Sanctuary, Santa Barbara, CA
Russell Nelson, (retired) NOAA Alaska Fisheries Science Center, Seattle, WA

In addition, Cisco Werner, Director Southwest Fisheries Science Center and Steve Ignell, Deputy Director Alaska Fisheries Science Center attended and participated as observers.

ACKNOWLEDGMENT OF PARTICIPATION

We first want to sincerely thank the panel members for the time they spent in preparing for and participating in the formal review and then writing a set of reports that were thorough, thoughtful and candid peer review of data programs for west coast groundfish. In addition, we want to acknowledge and thank our partners and stakeholders for participating in the review and for collaboration, without which we could not provide the data needed for coast-wide

stock assessments. Finally, we also thank all staff that prepared and presented material for this review and assisted in arrangements and logistics to conduct the review.

PANEL OBSERVATIONS AND RECOMMENDATIONS AND RESPONSES TO REVIEW PANEL COMMENTS

Observations

The review provided a comprehensive range of observations and comments to continue to improve on what was acknowledged to be a collaborative program of 'high caliber and depth of expertise, and significant creativity' in providing both fishery independent and dependent data to support west coast groundfish stock assessments and management. The Panel also noted that given the complexity of groundfish monitoring (90+ species managed) and limited resources, the Center has implemented an impressive scientific program with dedicated staff involved that ranks well above average compared to other fisheries world-wide, and is using the best available techniques and approaches for state-of-the-art stock assessments. Moreover, the Panel noted that continuing the bottom trawl survey was critical because it supports more assessments than any other fishery-independent source of data on the west coast. The Panel also appreciated the comprehensive ecosystem sampling conducted in the juvenile rockfish survey, and suggested that effort be expended to enhance its usefulness to the stock assessment process; overall, they were eager to see the environmental and ecosystem information developed in all data collection efforts. The Panel also commended the implementation of an observer program that has greatly increased the value of fishery dependent data and is available in a timely manner for in-season management. It is worth noting that the overall scientific program for west coast groundfish was initiated in the mid 1990's and as such is a relatively young program compared to other groundfish programs in NOAA Fisheries.

The Panel identified a several areas within the data collection and management program that would benefit from examination and improvement. The Panel's recommendations fall within the following areas: 1) conduct additional study of survey design and implementation, and stock assessment priority, 2) leverage existing and developing technologies, 3) pursue opportunities to improve the infrastructure of database systems, and 4) given budget constraints continue to improve and enhance, where possible, cooperation and coordination among internal and external partners, both existing partners and pursuit of new partners (academic, non-governmental, other federal agencies). Given these overall comments and suggestions for improvements we have grouped our response into the following themes:

- ✓ Science Program Management
- ✓ Data Management
- ✓ Data Application and Biological Sampling for Stock Assessments
- ✓ Biennial Assessment Cycle
- ✓ Survey Implementation
- ✓ Fishery-Independent Surveys
- ✓ Observer Program
- ✓ Emerging Technologies

During times when budget restraints are coupled with increasing demands for scientific information for fisheries management and increased understanding of the California Current ecosystem, it is becomes even more important to make well-reasoned strategic choices. Therefore, we also used National and center-level prioritization efforts, encapsulated in our Strategic Science Plan and Annual Guidance Memorandum, to inform our response to the Panel's recommendations.

RESPONSE TO PANEL RECOMMENDATIONS

Science Program Management

Recommendation: Prioritize mission elements and allocate resources strategically to meet data collection objectives for assessments and optimize scientific value from the survey data. Given the geographic scope of the California Current ecosystem, improve coordination with scientific partners including the SWFSC; in particular, address the perceived insularity of the groundfish program and the appropriate role of survey staff. The value of strategic decisions is magnified during times of continued budget restraints.

Response: The science enterprise in NOAA Fisheries has embarked on a strategic planning process. The NWFSC has a Strategic Science Plan in place, and we have instituted an Annual Guidance Memorandum that guides implementation and allows annual adjustment to changes that occur due to Congressional action, changes in fishery management needs, or other external factors. We have implemented an activity/project prioritization process to guide resource (funding and staff) allocation. The prioritization process is a work in progress and will improve in future cycles. A high priority activity is collecting survey data to meet fishery management needs, and this year's Annual Guidance Memorandum notes that resources will be re-directed, where appropriate, to meet 2014 survey needs, while maintaining adequate funding for other high priority science needs. In addition, we will continue coordination and collaboration with the SWFSC to effectively utilize ship time and staff resources to meet both survey needs and ecosystem process studies in our surveys of groundfish species and other species. This coordination will be carried out with full recognition of the decrease in capacity as a result of recent budget reductions and the commensurate need to reduce staffing or not back-fill vacancies to adapt to a new budget reality.

As noted above the groundfish survey program in the NWFSC is a relatively young program when compared to other fisheries science programs in NOAA Fisheries. Developing and implementing the program has been the focus up until recently. The Panel highlighted the value of the survey team being active in analyzing and publishing findings from the survey data and that there is value to enhancing internal and external collaborations. Due to the breadth of the review it was not possible to highlight for the panel all of the recent scientific productivity of the survey team in publishing analyzes using the survey data nor to fully highlight their collaborations across the NWFSC on peer-reviewed papers that are 'mining' the survey data for insights into the dynamics of the California Current ecosystem and status and trends in species abundance, productivity and diversity. There has been more collaboration than we were able to specifically make the Panel aware of and current leadership is working to implement an appropriate balance of research and data production, including efforts to develop staff research skills.

Overall, the comments of the Panel on resource allocation and coast-wide coordination and collaboration highlight the value of the process the NWFSC is developing for prioritization of activities and projects. Moreover, strategic guidance on priorities will benefit from coordination with West Coast partners, in particular the West Coast states, WCRO, PFMC, and SWFSC.

Action items:

1) An initiative for FY 2014 is to continue and expand coordination and collaboration with the SWFSC. We will develop a tactical plan for funding and staffing mission-critical surveys, identify improved or wider ecosystem- and climate-based data collection, and improve the efficiency

and coordination of current survey efforts with the SWFSC and our international partners, while working within the constraints of reduced resources.

2) We will continue to improve our annual activity prioritization process to effectively allocate NWFSC resources, and as noted below under survey implementation, conduct simulation experiments to assess alternative survey designs.

3) We will foster publication of survey results by the Survey Team and their continued within-Center collaborations between the survey team, with scientists from other Divisions and with external partners that utilize the groundfish monitoring data.

4) We will consider establishing a standing body including leadership of the NW and SW Fisheries Science Centers, the West Coast Region, the PFMC, and the PSMFC to discuss strategic priorities on a yearly basis.

Data Management and Access

Recommendation: Information management needs for the entire data collection enterprise were substantive and pervasive, and should be addressed comprehensively.

Response: Data infrastructure has indeed been a limiting and challenging element of our data collection and delivery efforts. We recognized the need for a comprehensive assessment of information management needs before the program review; overarching priorities are to update all systems to current and compatible platforms, automate as many data functions and processes as possible, and improve ease and speed of data delivery. We are currently working on three fronts to address this multi-year effort.

Action Items:

1) We are in the process of hiring a data manager, who will have responsibility for integrating and restructuring groundfish-related databases to provide more timely, useful and easily accessible data.
2) We are working (in the interim) with Center data management team to develop data processes and applications to improve observer data delivery and the groundfish trawl survey data system.
3) We are working with external partners to secure funding to design and implement systems that allow us to link catch and discard data more automatically.

The ultimate objective is to build a spatially referenced data library containing all NWFSC groundfish data. This is a multi-year effort and would likely benefit from a NOAA Fisheries-wide coordinated effort.

Data Application within Assessments and Biological Sampling

Recommendation: Clearly identify which data are most important for assessment accuracy and precision, and in particular, prioritize among types of biological data needs, and apply these to survey collections.

Response: We recognize and agree that key data needs could be better identified in our assessment process in general and for prioritized collection in surveys and fishery-dependent data collections efforts specifically. One constraint that we do face is that some of our data collections, such as ageing, are driven by targeted funding allocations that cannot be spent for other biological data collection purposes. Therefore, re-prioritization of other resources would need to be considered.

Action Items:

1) We will conduct a series of simulations and sensitivity analyses (see also below) to begin to identify data types and changes in collection approaches that have particularly strong effects on assessment results.
2) We are evaluating the use of "species meetings" rather than "sampling platform-centric" meetings between our assessors and those who collect data to help us optimize biological sampling for each species. Similar to data management, it will take time to fully design, implement and reap the benefits of this effort.

Biennial Assessment Cycle

Recommendation: Implement a policy of ongoing assessments, rather than the current biennial assessment cycle in order to better integrate research with assessments.

Response: The current on-year/off-year assessment cycle is driven by the Pacific Fishery Management Council's biennial harvest specifications determinations. In this system, harvest limits are set in even numbered years for the following two years (*e.g.*, targets are set in 2012 for 2013 and 2014). Currently, assessments are conducted in odd years to support the setting of harvest specifications in even years. Thus, an assessment conducted in 2011 to support 2012 targets has as its most current data the information from 2010. Concerns have been raised that this results in populations being managed with four-year-old data (*e.g.*, targets for 2014 were set with 2010 data). Extending the assessment period would result in stocks being managed with five-year old data, and to avoid this situation the Council has adopted an on-year/off-year system.

Action Items:

1) Articulate costs and benefits of a more continuous assessment process; discuss the option with PFMC as appropriate.

Survey Implementation:

Recommendation: Better document and evaluate the survey designs and appoint a monitoring program lead.

Response: It will be important to more fully document current and past survey designs both for further reviews and to preserve institutional knowledge, as well as to evaluate the effects of changes to those designs. We are eager to replace our survey/monitoring (now 'Groundfish Ecology") program manager, but are currently limited by funding and hiring conditions. This is likely to be a multi-year process.

Action Items:

1) Compile documentation for all surveys, with a focus on choices for current statistical design.
2) Conduct simulation and sensitivity analyses to evaluate the effect of survey sampling density, frequency and other changes on assessment results.
3) Begin process to backfill Groundfish Ecology Program Manager.

Fishery-Independent Surveys

Recommendation: Fishery-independent surveys were recognized to be critical components of our assessment data collection efforts and the following main recommendations were:

- Develop methods for surveying untrawlable habitats;
- Calibrate the past Alaskan triennial survey with our current trawl survey, and archive old data properly;
- Permanently allocate one of the new, quiet NOAA Fishery Research vessels to the hake survey;
- Develop new funding models for surveys.

Response: The recommendations cover a range of needed short- and long-term improvements to surveys. Some of these are being addressed at a national level. The agency currently has a national initiative to develop and test methods for surveying untrawlable habitats, for instance, and is exploring an overall model of cooperative management with industry. The NWFSC will continue to be actively engaged in all these efforts. In addition, we will continue to work to ensure that old data are not lost and to maintain the best possible conditions for our existing surveys. Calibrating the past Alaska Fisheries Science Center triennial survey with our current data collection methods is somewhat more complicated than it appears at first blush, due to a wide range of differences in protocols, gear and other factors.

Action Items:

1) Continue to represent NWFSC and groundfish needs actively at national efforts to develop and implement survey methods for untrawlable habitat.
2) Archive old data as resources allow.
3) Articulate requirements for fully calibrating historic and current surveys, as well as benefits of the effort, to inform allocation of resources.
4) Work with OMAO and NOAA HQ to ensure sufficient ship time on one vessel (*e.g.*, Bell M. Shimada) for the hake survey, as well as adequate calibration time in the future, as resources allow.

Observer Program

Recommendation: Improve data management, explore alternative funding systems, and potentially alter sampling regimes to exploit the change in discard patterns (*i.e.*, less discard) that is occurring with the implementation of the groundfish IFQ program.

Response: Our Fisheries Observer Science Program is a vital part of our data collection program and the Panel was impressed with the high quality of the Program. We are prioritizing observer data systems for improvement, and are currently working on several fronts in this area.

Funding regimes are not within our direct control at this point; however, as noted before, the agency is exploring the potential of cooperative management, which may include alternative funding arrangements with industry. Current staffing issues, and the tight restrictions on hiring additional staff are limiting our ability to be proactive, but we are working both internally and externally to ensure that robust data collection continues in the face of changes in the fishery and monitoring systems, such as electronic monitoring.

Action Items:

1) Implement database improvements to expedite delivery of observer data
2) Develop a formal process for soliciting research projects using observers
3) Participate in regional and national processes to evaluate and implement Electronic Recording and Monitoring, including submitting proposals to test such technologies as appropriate.
4) Implement "species meetings" for determining best or necessary platforms for providing critical assessment data, and ensure that changes in fishery practices do not eliminate existing data streams.

Emerging Technologies

Recommendation: The Center should work to operationalize novel technologies, enhance current data collection in anticipation of a greater ecosystem focus in future assessments, and expand the use of genetic data to elucidate stock structure.

Response: All of these are very useful suggestions for improving our data collection and management programs. We are currently working with national initiatives to identify, and ultimately operationalize novel technologies that are cost-effective. We will also work (as noted above) to identify key biological and ecosystem data to be collected during surveys. Current constraints on collecting such additional data are linked to personnel (reduction in overall staff levels) and the platforms (*e.g.*, small chartered fishing vessels) we currently use for our surveys. We are extremely interested in expanding our current genetic studies and will seek to do that as resources permit.

Action Items:

1) Continue to work with national advanced technology initiatives, including submitting proposals to operationalize technologies that have been tested.
2) Prioritize biological and ecosystem data for collection on surveys that meet current and anticipated future data needs.
3) Prioritize backlog of existing genetic samples for analysis.